

[TABLE 1]

FY3075

Mixed Powder No.	MIXED POWDER						
	Iron Based Powder	Other Alloy Element Powder	Graphite Powder, % By Mass	Copper Powder, % By Mass	Fine Particle Powder For Improving machinability		
	Kind*	Kind**: Amount Of Blending (% By Mass)			Kind ***	Mean Particle Diameter μm	Amount Of Blending, % By Mass
1	A	-	1.0	10	-	-	-
2		-	1.5	10	-	-	-
3		-	1.5	15	-	-	-
4		-	1.5	20	-	-	-
5		-	0.8	4	-	-	-
6		-	0.4	20	-	-	-
7		-	3.0	20	-	-	-
8		-	0.5	45	-	-	-
9		-	1.5	20	I	20	0.60
10		-	1.5	20	II	30	0.60
11		-	1.5	20	III	30	0.60
12		e:10	1.0	20	I	20	0.75
13		d:5, e:10	1.0	20	I	20	0.75
14		d:10	1.0	20	I	20	0.75
15		f:5	1.0	20	I	20	0.75
16		a:20	1.0	20	I	20	0.75
17		b:5	1.0	20	I	20	0.75
18		c:3	1.0	20	I	20	0.75
19		e:55	2.5	30	I	20	0.75
20		a:10, d:10, e:55	2.5	20	I	20	0.75
21	B	-	2.5	30	I	20	0.75
22	C	-	2.5	30	I	20	0.75
23	B	e:50	2.5	30	I	20	0.75

*) A: pure iron powder, B: SUS 410L, C: SUS 430

**) a: Cr powder, b: Mo powder, c: VV powder, d: Fe-Mo powder, e: Fe-Cr powder, f: Fe-W powder

***) I: MnS, II: CaF₂, III: enstatit

[TABLE 2-1]

Sample No.	Mixed Powder No.	Sintered Body											Preheating Before Enveloped Casting	Properties After Enveloped Casting		Note			
		Shot Blast Treatment	Steam Treatment	Composition (Content, % By Mass)				Porosity, % By Volume	Shape Of Pore	Contents Of Particles For Improving Machinability, % By Mass	Free Cu Phase, Area %	Structure Of matrix ***		Surface Roughness Rz μm	Tensile Properties		Thermal Expansion Coefficient		
				C	Cu	Other Elements	Total Contents Of Other Elements								Balance		Tensile Strength*	Thermal Expansion Coefficient $\times 10^{-6} K^{-1}$	
																			Bonding Strength Ratio****
1	1	Yes	Yes	0.9	10	-	-	Fe	15	Isolated And Partially Connected	-	P	32	2.9	12.2	RT	1.0	12.3	Example
2	2	Yes	Yes	1.4	10	-	-	Fe	14	Isolated And Partially Connected	-	P	33	2.9	12.1	200	1.1	12.3	
3	3	Yes	No	1.4	14	-	-	Fe	14	Isolated And Partially Connected	-	P	26	2.8	12.6	RT	1.0	12.8	Example
4	3	Yes	No	1.4	14	-	-	Fe	14	Isolated And Partially Connected	-	P	44	2.8	12.6	200	1.1	12.8	
5	3	Yes	Yes	1.4	14	-	-	Fe	14	Isolated And Partially Connected	-	P	43	2.7	12.6	200	1.2	12.8	Example
6	4	Yes	No	1.4	18	-	-	Fe	13	Isolated And Partially Connected	-	P	25	2.6	13.2	200	1.1	13.5	
7	4	Yes	No	1.4	18	-	-	Fe	13	Isolated And Partially Connected	-	P	44	2.6	13.2	200	1.2	13.5	Example
8	4	Yes	Yes	1.4	18	-	-	Fe	13	Isolated And Partially Connected	-	P	45	2.6	13.2	200	1.5	13.5	
9	4	Yes	Yes	1.4	18	-	-	Fe	13	Isolated And Partially Connected	-	P	74	2.6	13.2	200	1.4	13.5	Example
10	4	Yes	Yes	1.4	18	-	-	Fe	4	Isolated And Partially Connected	-	P	42	3.1	12.9	200	0.8	-	
11	4	Yes	No	1.4	18	-	-	Fe	40	Continuous	-	P	41	0.7	11.9	200	2.2	16.5	Comparative Example
12	4	Yes	No	1.4	18	-	-	Fe	13	Isolated And Partially Connected	-	P	8	2.6	13.2	200	0.9	-	

*) The tensile strength ratio is expressed by defining to the strength of ADC 12 alloy as 1.0

****) P: pearlite, B: bainite, M: martensite

*****) The bonding strength in the case of using aluminum plated cast iron is defined as 1.0

[TABLE 2-2]

Sample No.	Mixed Powder No.	Sintered Body													Preheating Before Enveloped Casting Temperature °C	Properties After Enveloped Casting		Note	
		Shot Blast Treatment	Steam Treatment	Composition (Content, % By Mass)				Porosity, % By Volume	Shape Of Pore	Contents of Particles For Improving Machinability, % By Mass	Free Cu Phase, Area %	Structure Of Matrix ***	Surface Roughness Rz μ m	Tensile Property		Thermal Expansion Coefficient ×10 ⁻⁶ K ⁻¹			
				C	Cu	Other Elements	Total Contents Of Other Elements							Balance			Tensile Strength*		Thermal Expansion Coefficient
13	4	Yes	No	1.4	18	-	-	Fe	13	Isolated And Partially Connected	-	17	P	102	2.6	13.2	0.9	-	Comparative Example
14	5	Yes	No	0.8	4	-	-	Fe	10	Isolated And Partially Connected	-	=	P	45	3.3	11.9	0.5	-	Comparative Example
15	5	Yes	Yes	0.8	4	-	-	Fe	10	Isolated And Partially Connected	-	=	P	81	3.1	11.9	0.8	-	Comparative Example
16	6	Yes	Yes	0.4	18	-	-	Fe	35	Isolated And Partially Connected	-	16	P	48	0.9	12.0	2.1	16.3	Comparative Example
17	7	Yes	Yes	2.7	18	-	-	Fe	15	Isolated And Partially Connected	-	18	P	45	0.9	12.7	0.7	-	Comparative Example
18	8	Yes	No	0.5	43	-	-	Fe	6	Isolated And Partially Connected	-	43	P	51	0.8	15.1	1.2	-	Comparative Example
19	12	Yes	No	0.9	18	Cr:6.0	6.5	Fe	15	Isolated And Partially Connected	MnS:0.75	16	P	27	2.4	12.5	1.1	12.7	Example
20	13	Yes	No	0.9	18	Cr:6.0, Mo:2.5	8.5	Fe	15	Isolated And Partially Connected	MnS:0.75	16	P	26	2.2	12.2	1.1	12.5	Example
21	14	Yes	No	0.9	18	Mo:5.0	5.0	Fe	15	Isolated And Partially Connected	MnS:0.75	16	P	29	2.1	12.3	1.1	12.5	Example
22	15	Yes	No	0.9	18	W:2.5	2.5	Fe	15	Isolated And Partially Connected	MnS:0.75	16	P	31	2.1	12.3	1.1	12.4	Example
23	19	Yes	No	0.9	27	Cr:30.0	30.0	Fe	34	Isolated And Partially Connected	MnS:0.75	21	M	28	1.6	10.1	2.3	13.9	Example
24	20	Yes	No	2.4	27	Cr:40.0, Mo:5.0	45.0	Fe	34	Isolated And Partially Connected	MnS:0.75	15	M	24	0.8	10.4	2.3	12.7	Comparative Example
25	21	Yes	No	2.4	28	Cr:8.5, Si:0.5, Mn:0.1	9.1	Fe	30	Isolated And Partially Connected	MnS:0.75	24	M+B	27	1.5	11.9	2.1	14.1	Example
26	22	Yes	No	2.4	28	Cr:12.0, Si:0.5, Mn:0.1	12.6	Fe	30	Isolated And Partially Connected	MnS:0.75	24	M+B	33	1.5	11.1	2.1	13.9	Example
27	23	Yes	No	2.4	28	Cr:30.0, Si:0.1	30.1	Fe	30	Isolated And Partially Connected	MnS:0.75	24	M	31	1.3	10.7	2.1	13.8	Example

*) The tensile strength ratio is expressed by defining the strength of ADC 12 alloy as 1.0

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****) The bonding strength in the case of using aluminum plated cast iron is defined as 1.0